Milstar Satellite System

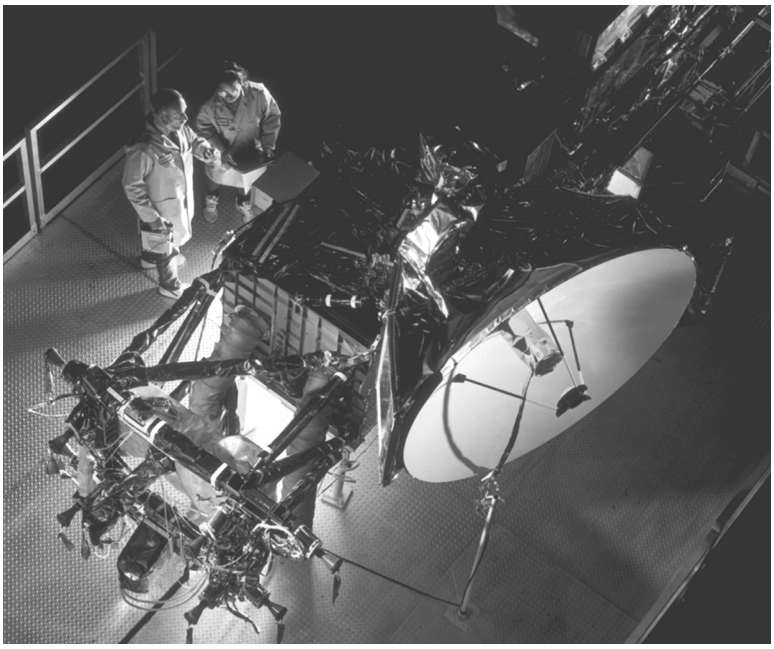
The Milstar satellite system supports strategic and tactical missions through global communications that are secure, jam resistant, survivable, and have a low probability of intercept.

Milstar provides worldwide coverage for multi-Service ground, airborne, submarine, and shipborne terminal communications connectivity. There are the three Milstar segments: space, terminal, and mission control.

- Space Segment: The full Milstar operational capability will be provided by five geo-synchronous satellites. The first two satellites possess the original strategic communications low data rate (LDR) payload, while subsequent satellites will also possess a tactical medium data rate (MDR) payload. Each LDR/MDR satellite uses a variety of antennas to support the requirements of both tactical and strategic users. Additionally, cross-links between the satellites provide worldwide connectivity without using vulnerable ground relays.
- Terminal Segment: The Milstar terminal segment consists of a family of multi-Service ground, shipborne, submarine, and airborne terminals functionally interoperable and tailored to meet the individual Service requirements. These terminals include the Air Force air and ground command post terminals; the Navy Extremely High Frequency Satellite Program (NESP) ship, shore, and submarine terminals; and the Army's Single-Channel Anti-jam Man- Portable terminal and Secure, Mobile, Anti-jam, Reliable, Tactical Terminal (SMART-T).
- Mission Control Segment: The Milstar mission control segment provides communications resource management and satellite operations support. The primary responsibility of the mission control segment is to maintain the satellite in a state of readiness to support user communication requirements during all levels of conflict.

The first Milstar satellite was launched in 1994 onboard a Titan IV rocket. The second satellite was launched in 1996. Milstar Flight 3, the first LDR/MDR satellite, was launched on April 30, 1999. However, the mission was declared a failure when a problem with the Centaur upper stage placed the satellite in a nonoperational orbit. Milstar Flight 4 was launched on February 27, 2001, and was declared operational on July 23, 2001. Milstar Flight 5 was launched on January 15, 2002, and was declared operational on March 29, 2002. Milstar Flight 6 is scheduled to launch in February 2003. In lieu of an additional Milstar satellite to replace Flight 3, the first flight of the Advanced Extremely High Frequency (AEHF) satellite program (Pathfinder) was to be launched on an accelerated schedule. Restructuring of the AEHF program to reduce technical and funding risk has eliminated the accelerated launch date, but the Pathfinder will be programmed to operate initially as a Milstar II LDR/MDR satellite.

Air Force Space Command declared Initial Operational Capability (IOC)-1 for Milstar on July 21, 1997. The Milstar LDR system currently supports IOC-1 missions. Multi-service Operational Test and Evaluation (MOT&E) of the LDR/MDR satellites began in late FY01. Delays in development and testing of the resource planning and monitoring software will prevent completion of MOT&E in time to support a December 2003 IOC-2 decision. AF Space Command has not yet determined how they will respond to this breach.



The Milstar satellite system provides secure, jam resistant, survivable worldwide coverage for multi-Service ground, airborne, submarine and shipborne terminal communications connectivity.

TEST & EVALUATION ACTIVITY

- LDR Initial Operational Test and Evaluation (IOT&E) was completed in March 1997.
- The Milstar IOT&E Final Report (August 1998) stated that the Milstar LDR system was effective and suitable with limitations.
  - DOT&E and Air Force Space Command (AFSPC) directed the Air Force Operational Test and Evaluation Command (AFOTEC) to retest six Measures Of Performance (MOPs).
    - Of these, AFOTEC retested three connectivity MOPs during the period of September 1999 to February 2000.
    - AFOTEC also conducted tests from June 2000 to May 2001 to re-evaluate two suitability MOPs.
- MDR operational tests focus on individual and combined Service terminals communicating through an on-orbit satellite.
  - Operational testing with Flights 4 and 5 began with Developmental Test/Operational Test events during the on-orbit test periods and continue with dedicated Operational Test events that began in late FY01.
- The Army's SMART-T underwent Follow-on Test and Evaluation for MDR capability in September 2001, while the Navy tested its MDR-capable NESP terminal in April- May 2002.
- Anti-jamming and low probability of intercept are two critical capabilities of the Milstar system, and both were tested with an on-orbit satellite in FY01.
  - MDR uplink anti-jam capabilities were developmentally tested via a demonstration of the nulling antenna during the Milstar system test of Flight 4.
- Most of the test activity this year involved developmental testing of the mission planning element, MDR interoperability, and Flight 5.
  - The Automated Communications Management System (ACMS) continued a series of developmental events to eventually support a fielding decision.
  - The Joint Interoperability Test Command (JITC) tested interoperability between MDR-capable terminals and issued certification letters in October 2002.
  - The emphasis of the Flight 5 system test was on verifying the establishment of the Milstar "ring" constellation, the performance of multi-satellite MDR communications, inter-satellite timing resolution, and evolving ACMS capabilities.

TEST & EVALUATION ASSESSMENT

The Milstar Space Segment continues to perform well, as currently fielded with LDR capability. As there has been limited dedicated operational testing with the on-orbit LDR/MDR satellite, no assessments can be made regarding operational effectiveness and suitability. However, review of the developmental test program for the space segment has not revealed any areas of operational concern.

The loss of Flight 3 (the first LDR/MDR satellite) degrades operational utility. Worldwide coverage from 65° South to 65° North latitude will not be available for the Milstar MDR terminals until the launch of the first AEHF (Pathfinder) satellite in FY08. The lack of a fourth medium data rate satellite will limit the ability to provide two-satellite coverage to some contingency operations and therefore limit the throughput of protected communications. Another impact of the loss of Flight 3 is that approximately 25 degrees of longitude will have no MDR coverage (based on current plan for satellite placement).

The Milstar Terminal Segment has met mixed results. The Navy's LDR terminals have been successfully fielded for 5 years. The Air Force airborne terminal has demonstrated the required reliability and maintainability. However, the Army ground terminals have demonstrated reliability and maintainability shortfalls. Further discussion of the Navy NESP and Army SMART-T terminals are provided in separate sections of this annual report.

The Mission Control Segment for LDR operations has been performing its mission successfully since the launch of the first Milstar satellite in 1994. During LDR IOT&E, the mobile constellation control station's endurance ability was not tested. DOT&E directed a full test of the endurance requirement during follow-on testing. AFOTEC is working toward conducting the endurance retest in FY03 and has identified their requirements to United States Strategic Command to plan an appropriate test event.

Additionally, delays in development of ACMS are of concern. Because of the existing shortfalls of ACMS, the Army and Navy have fielded their terminals with interim planning software (the Milstar Communications Planning Tool – integrated (MCPT-i)), as their primary planning tool. Under this scenario, MCPT-i should be tested to verify it meets all the requirements of the Mission Planning Element, and interoperability between ACMS and MCPT-i should be tested.

Finally, in the realm of interoperability, there is currently no concept of operations (CONOPS) for the Joint Task Force (JTF) mission. Test of the JTF mission is critical to evaluate interoperability of the Milstar system and terminals in an operational context. Some interoperability demonstrations have been conducted during developmental testing, including the JITC MDR interoperability test. However, until the CONOPS is specified, it is not known if the limited base band used in these tests is operationally representative. DOT&E recommends a CONOPS be developed as soon as possible. In the absence of a CONOPS, AFOTEC has worked with Atlantic Fleet Command and Air Force Special Operations Command to devise the most operationally realistic test possible. They will participate in a communications exercise in January 2003 to conduct this test.